

limit for the population error rate at the confidence level desired,
based on the actual sample results.”¹⁷

4.3 In 4.2 above, Mr. Loebbecke is discussing evaluation of the estimated proportion of errors; in this case the upper bound is appropriate (and the upper bounds were indeed the ones reported by Ernst & Young).

4.4 To evaluate the overstatement of the inventory value, refer to Roberts’ text on **Statistical Auditing**. In it, he explains:

“Much of the auditor’s work is not constructive, but critical. He must decide whether the evidence supports such propositions as compliance with the pertinent accounting control is satisfactory, this inventory amount is not materially misstated,... In these circumstances the auditor must decide whether or not the statistical evidence supports the proposition.”¹⁸

4.5 Both the Roberts and Loebbecke texts state that the amount of misstatement that is regarded as “material” should be specified ahead of time – something not done in these audits. Both texts go on to describe constructing decision limits and critical intervals for deciding whether there is enough statistical evidence that the material amount¹⁹ is misstated.

4.6 Unfortunately, these procedures were not followed for the property record audits – a major design flaw and one of the root causes of the poor precision achieved. In any case, these non-standard property record audits cannot be treated exactly like the auditing textbook examples. However, it is clear from these

¹⁷ Arens and Loebbecke, **Applications of Statistical Sampling to Auditing**, Prentice Hall Inc., New Jersey, 1981, p. 75

¹⁸ Roberts, **Statistical Auditing**, American Institute of Certified Public Accountants, New York, NY, 1978 p. 40

¹⁹ Also, when assessing material amounts, both texts consider overstated AND understated amounts in the audit.

textbooks, Mr. Loebbecke's included, that a confidence bound, not the point estimate, should be used when considering the results of an audit.

4.7 To argue that the point estimates in this audit should be used no matter what, is equivalent to arguing that so long as you can find some formula in a book, you can allow any estimate to be used anytime, anywhere, no matter how imprecise or how severe the consequences. Such an argument is simply not statistically sound.

5 A One-Sided Lower Confidence Bound Should be Used.

5.1 There are several reasons why the lower bound should be used for assessing the amount of overstatement in the property records. First of all, only a material overstatement is being assessed. Dr. Bell and AT&T make it very clear that the property record audits never intended to even consider that the RBOCs may have understated any of the value of their hardwire equipment.

5.2 There were simply no data gathered to evaluate understated inventory. This was not a two-way audit; no attempt was made to look for items that were in service but missing from the property records. The auditors did not even increase the quantity shown when more items were found than the number reported in the CPR database.²⁰ This is one-sided decision-making means that there is interest in only one side of the confidence interval.

5.3 The lower bound should be used because when using statistical evidence to state with a level of confidence that the true value of the overstated inventory is at least a certain amount, the lower confidence bound is the largest value that can be used for that amount.

²⁰ The RBOC's reported to Ernst & Young that the FCC scored a record as "unverifiable" when a larger quantity was found than the quantity reported.

5.4 For example, in a statement like, “the overstated inventory is at least 2 million dollars,” the value of 2 million dollars must be the lower confidence bound in order to make the statement with a level of statistical confidence. It cannot be said statistically with any reasonable degree of confidence that the true value is at least the estimated amount, nor can it be said that the true value is at least the upper confidence bound. Every number inside the confidence interval is statistically the same. To make a correct statistical statement with a reasonable level of confidence it can only be said that the true amount is at least the lower confidence bound.

5.5 In addition, the FCC staff was in complete control of the sample design, and the onus was on them to assure appropriate precision. If the point estimate, or the upper confidence bound is used, there is no incentive to conduct an audit with an adequate enough sample. If the point estimate is used, then any estimate, no matter how imprecise (see 3.3 and 4.2) can be used. Clearly this is not appropriate. Nor is the upper bound appropriate, because this can be made arbitrarily large by implementing a poor sample design. The appropriate number for an audit such as the CPR audit is the lower confidence bound.

5.6 This is supported by the Committee on Applied and Theoretical Statistics on the Board on Mathematical Sciences, National Research Council.²¹ This is also consistent with practices by the Internal Revenue Service (IRS).²²

5.7 The lower bound is entirely appropriate because when the government conducts an audit, the taxpayers, like the RBOCs, have no control over the precision of the estimates. They have no say in the design specifications, sample size, or conduct of the audit.

²¹ Panel on Nonstandard Mixtures of Distributions, *Statistical Models in Analysis and Auditing*, Statistical Science, 1989, Vol. 4, No. 1, pp. 2-33. “Because the government may not wish to overestimate the adjustment that the auditee owes the government, interest often centers on the lower confidence limit of monetary error at a specified confidence level allowed by the policy.”

²² Internal Revenue Manual, 1982 42(18) 14.1

6 A Conservative Approach to Determining the Confidence Level is Needed.

6.1 AT&T states that the most commonly used confidence interval in statistics based regulations is 95 percent.²³

6.2 Under normal circumstances for a government conducted audit, a 95 percent confidence level may be appropriate. However, the circumstances of the property record audits are not normal.

6.3 There were several non-random and immeasurable sources of error and potential bias introduced during the implementation of the audits. A few of these sources are discussed below.

6.4 After the initial random selection of central offices, the FCC selected additional offices to cover specific states.^{24,25} This introduces an unknown amount of bias and was not accounted for in the estimation stage. In the textbook that Mr. Loebbecke co-authored, it is explained that this is a type of judgmental sampling and it states that it is improper and a “serious breach of due care”²⁶ to use *statistical measurement techniques* if the sample is selected judgmentally. The text goes on to state that:

²³ *Comments of the AT&T Corp.*, p.5. Note, that other references may discuss a 90 or 95 percent confidence level in sample based results. However, it is important to determine whether the government or the auditee was responsible for the sample design and its budget. When the auditee chooses the lower confidence level of 90 percent, then they are accountable for its consequences. It is also important to determine whether the confidence level discussed is for a one or two sided confidence interval. The one-sided 95 percent lower confidence bound is exactly the same as the lower bound of a two-sided 90 percent confidence interval.

²⁴ *Audit of the Continuing Property Records of BellSouth Telecommunications, Inc. As of July 31, 1997*, Appendix B, p. 6

²⁵ *Audit of the Continuing Property Records of the NYNEX Telephone Operating Companies Also Known As Bell Atlantic North As of March 31, 1997*, Appendix B, p.6

²⁶ Arens and Loebbecke, *Applications of Statistical Sampling to Auditing*, Prentice Hall Inc., New Jersey, 1981 p. 24

“Only valid statistical selection methods are acceptable when the auditor intends to evaluate a population statistically.”²⁷

6.5 Despite all of Mr. Loebbecke’s and AT&T’s claims to the contrary, there were substantial coding inconsistencies by the auditors. This was established by comparing the scores the auditors told the RBOCs they were receiving on each item at the time of the fieldwork to the scores they actually received after the audits were reviewed back in the home office. For example, about 12.5% of SBC’s codes were rescored²⁸ and over 15 percent of Bell Atlantic South’s codes were rescored.²⁹ How can there be any assurance that these post-inspection adjustments are correct or that others that may not still be necessary were found and recoded by the FCC staff’s own internal review?

6.6 If only 95 percent confidence statements are made, then implicitly the assumption is being made that these audits were done with normal care and minimal “nonsampling” error. There is “nonsampling” error in these audits that is impossible to quantify yet cannot be ignored. As we said in our original submission and reiterate here a plausible approach in the presence of such error is to increase the confidence level to a percentage above the standard 95 percent.

6.7 Considering the unmeasurable amount of error introduced from improper sample selection and coding inconsistencies, the prudent choice would be perhaps a 99 percent confidence level to compensate for the unknown amount of error.³⁰

²⁷ *Ibid.*

²⁸ *Reply to December 22, 1998 Draft Report of the Federal Communications Commission Accounting Safeguards Division Audit of Nevada Bell and Southwestern Bell Telephone Company, Attachment A*

²⁹ *Response to Audit Staff Draft Report of Findings Related to Audit of Continuing Property Records of Bell Atlantic, Appendix A, p. 18.*

³⁰ We should also stress here that we are considering one-sided confidence bounds. If the margin of error used for a one-sided 99 percent lower confidence bound is used to produce a confidence interval, then it is a 98 percent confidence interval.

7 Negative Lower Confidence Bounds

7.1 To calculate a lower confidence bound, the amount of precision, also sometimes known as the “margin of error,” is subtracted from the estimate. Therefore, some estimates for overstated dollars from the property record audits might have negative lower confidence bounds. Indeed, based on our calculations this did occur. The margins of errors for the estimates were larger than the estimates themselves.

7.2 Statistically, when zero is above the lower confidence bound, the audit results cannot be used as evidence that the property record overstated amount is more than zero. This is simple classic textbook statistics, not improper mathematics nor illogical thinking as AT&T asserts.³¹

7.3 The fact that there are negative lower confidence bounds when there were indeed some cases in the sample that would at the very least account for a few thousands dollars of overstated value, demonstrates the poor precision obtained in the audit, not any improper calculation of confidence bounds. As a result, the precision achieved by the audit is too poor to be actionable in adjusting the value of the RBOC property.

8 The Property Record Audits Erroneously Used Too Many Degrees of Freedom

8.1 Dr. Bell agrees with Ernst and Young³² that the estimates from the property record audits should have had a smaller number of degrees of freedom³³ in the calculation of the margin of error, and therefore, the confidence intervals are actually wider than those portrayed by the FCC. However, Dr. Bell guesses

³¹ *Comments of the AT&T Corp.*, p.25

³² *Affidavit of Robert M. Bell*, p. 11

³³ The degrees of freedom determine which constant is used when calculating the margin of error for a specified confidence level. Smaller degrees of freedom produce larger margins of error. Dr. Bell actually states as fact that the degrees of freedom for the audit studies would be about 20 to 24. But considers 10 to 20 in his calculations.

that there would only be a 6 to 14 percent increase in the width of the confidence intervals because the smallest number of degrees of freedom he contemplates are in the range of 10 to 20.

8.2 In fact, there are far less than 10 degrees of freedom for many of the estimates of the overstated inventory amounts. Our calculations indicate that some of the RBOC estimates only have two or three degrees of freedom.³⁴ Therefore, the affect on the confidence intervals is much more substantial than Dr. Bell leads his readers to believe.

8.3 Using resampling methodology (see 10.3), we calculate that the margin of error for a 95 percent lower confidence bound for the dollar value will increase 30 to 50 percent (depending on the RBOC³⁵) over the standard methodology found in textbooks.

9 The Property Audit Estimates are Biased.

9.1 Dr. Bell states that the audit staff produced essentially unbiased point estimates for both the percentage of missing items and the total dollar amount of missing investment.³⁶ Based on the quite limited nature of his representation, we are uncertain how he is able to speak to this. In our view, there are several sources of bias in the audits, worth reiterating here

9.2 First of all, the formulas that the FCC staff reports using produce biased estimates. This is clearly stated under the description of the formulas in the text

³⁴ *Response to Audit Staff Draft Report of Findings Related to Audit of Continuing Property Records of Bell Atlantic*, Appendix A, p. 15. *BellSouth's Response to Audit of Continuing Property Records of BellSouth Telecommunications As of July 31, 1997*, Appendix A. *BellSouth's Response to Audit of Continuing Property Records of BellSouth Telecommunications As of July 31, 1997*, Appendix A..

³⁵ *Response to Audit Staff Draft Report of Findings Related to Audit of Continuing Property Records of Bell Atlantic*, Appendix A, pp. 12-18. *BellSouth's Response to Audit of Continuing Property Records of BellSouth Telecommunications As of July 31, 1997*, Appendix A.

³⁶ *Affidavit of Robert M. Bell*, p. 6

by Cochran³⁷ which both the FCC staff and Dr. Bell cite. In fact, Ernst & Young did study this issue and we agree that the amount of bias (from this source only) is rather small.

9.3 Second, Dr. Bell does not mention at all the bias introduced by the FCC staff when, after the fact of the initial sample selection, the FCC staff added central office sites, to obtain to obtain central offices in particular states.³⁸

9.4 Third, the FCC staff substituted, for the sake of convenience, central offices that were in undesirable or inconvenient locations. Thus the population available for sampling is not the population that estimates are being made on.

9.5 Since the basic formulas themselves are biased, and there are sources of bias in the coding and in the sample selection, it is inappropriate to represent the property audit estimates as “unbiased.”

10 The Affect of Asymmetry is to Reduce the Lower Confidence Bound.

10.1 Dr. Bell comments on the problems of asymmetry of the confidence intervals³⁹ and cites Efron and Tibshirani⁴⁰ as a source for methods to correct for this. The procedures discussed in that text, however, are entirely inappropriate given the complex sample design employed in the audit. The Efron and Tibshirani reference does not even address stratified sample designs – much less two-stage stratified samples. For a proper discussion of the issues of bootstrapping in complex settings, refer to the papers by Sitter⁴¹ and by Rao and Wu.⁴²

³⁷ Cochran, **Sampling Methodology 3rd ed.**, John Wiley and Sons, New York, New York, 1997

³⁸ See footnotes 24 and 25.

³⁹ *Affidavit of Robert M. Bell*, p. 11

⁴⁰ Efron and Tibshirani, ***An Introduction to the Bootstrap***, Chapman & Hall, 1993

⁴¹ Sitter, *A Resampling Procedure for Complex Survey Data*, **Journal of the American Statistical Association**, 1992, 87, pp. 755-765.

⁴² Rao and Wu, *Resampling Inference with Complex Survey Data*, **Journal of the American Statistical Association**, 1998, 83, pp. 231-241

10.2 Furthermore, in paragraph 32 of his affidavit, Dr. Bell states,

“Specifically, the lower end of the interval should be closer to the point estimate than is the upper end of this interval.”

His unsubstantiated claim is wrong again.⁴³ In fact, we present quite clear contrary evidence. (See 10.3 below.)

10.3 Ernst & Young explored this issue using another resampling technique, different from bootstrapping, and our analysis of the situation suggests otherwise.⁴⁴ This is something Dr. Bell failed to mention. The first stage of sampling the central office sites⁴⁵ from the sampling frame was analyzed by Ernst & Young. It was found that the asymmetry effect is exactly the opposite of Dr. Bell’s assertion. The lower bound extends further away from the point estimate. Dr. Bell is right about one thing; in paragraph 32, he notes that the size of the suitable correction is quite large. However, the effect is to further lower the confidence bound.

11 The Sample Was Not Designed to Produce Precise Estimates of Overstated Inventory.

11.1 The sample was initially designed to estimate the proportion of property records that were in error, not the dollar amount overstated. In fact, the initial sample size calculations were based on a simple random sample, not on the complex design actually used. Dr. Bell agrees with this.

11.2 If the audits had only been used to estimate the percent of records in error, there probably would not have been as many difficulties. However, the audits

⁴³ Dr. Bell even contradicts his own statements later in paragraph 34 when he states that he cannot determine which way the limit will shift.

⁴⁴ See footnote 35.

⁴⁵ The variation among the primary sampling units, which are the central office sites selected, constitutes the major source of variation in a two stage sample and thus Ernst and Young’s analysis the considers the majority of the variance.

were used to estimate total dollars in error, and the sample design chosen was grossly insufficient for this purpose.

11.3 It is apparent that there were two functions of the audit: one was to establish overstated investment; the other was to estimate the proportion of the percent of records in error. The estimate of the overstated investment has the more serious consequences and the design was inadequate for this – as evidence by the large variability of the dollar estimates resulting in the extremely poor precision levels.

11.4 If the goal were to estimate the amount of overstatement, then the sample should have been designed differently from the beginning in order to obtain reasonable confidence and precision levels of the overstated amount.

11.5 Mr. Loebbecke spells this out in another co-authored textbook:

“The most important differences among tests of controls, substantive tests of transactions and tests of details of balances is in what the auditor wants to measure. ... In tests of details of balances, the concern is determining whether the monetary amount of an account balance is materially misstated. Attributes sampling, therefore, is seldom useful for this purpose. Instead, auditors use two types of statistical methods that provide results in *dollar* terms. These are *monetary unit sampling* and *variable sampling*.”⁴⁶

This CPR property audit is a classic example of an attribute sample⁴⁷ being used inappropriately when another design should have been employed.

11.6 The appropriate sample design would still most likely have incorporated a two-stage approach. However, sample size determinations would have been

⁴⁶ Arens and Loebbecke, **Auditing An Integrated Approach 6th ed.**, Prentice Hall, Englewood Cliffs, New Jersey, 1994, p. 459

calculated based on dollar values rather than proportions and should have incorporated a two-way audit for understated inventory as well as overstated inventory. Also the required sample sizes, especially the number of central offices, may have had to be larger to achieve reasonable precision on dollar estimates.⁴⁸

11.7 We disagree with Dr. Bell⁴⁹ that the variance of the proportion estimate would have increased significantly if the design were based on estimating dollar values. His speculation is contrary to both theory⁵⁰ and to our experience. As noted, dollar estimates probably would have required a larger number of central offices in the sample size. Thus, it is unlikely the variance of the proportion estimate would have suffered. In fact, the increased sample may have even improved the precision of the proportion estimates and the FCC could have achieved narrower confidence intervals for the proportion as well.

11.8 Dr. Bell states that it is not possible to optimize a design for both estimates of the dollars in error and estimates of the proportion of records in error.⁵¹ However, it should be noted that this type of problem occurs in almost all large, complex surveys. Sampling statisticians have found that it is possible to satisfy reasonable precision requirements for multiple estimates.

11.9 In addition, AT&T asserts that a two-way audit would have required a costly 100 percent inventory review at each central office selected.⁵² This is again, untrue. "Area sampling" could have been implemented where only a

⁴⁷ An "attribute sample" is intended to estimate a percentage.

⁴⁸ Note that Dr. Bell states that the expected value of an estimate is not influenced by heavily over sampling high cost items (as in pps). That is not the main point. The variability is reduced by pps sampling which is why it should be considered. Also see 11.11.

⁴⁹ *Affidavit of Robert M. Bell*, pp. 5-6

⁵⁰ Cochran **Sampling Methodology** 3rd ed., John Wiley and Sons, New York, New York, 1997, p. 110

⁵¹ *Affidavit of Robert M. Bell*, p. 6

⁵² *Comments of the AT&T Corp.*, pp. 10-11

portion of the office was completely examined, and what was found checked against the CPR records. This is a commonly used practice.

11.10 Dr. Bell asserts that the expected value of an alternative design (using, say, the PPS approach mentioned above) would be the same as under the current design. He presents this in such a manner as to lead the reader to believe the estimated amount of dollars in error would be similar, even if another design were used. This is a false impression.

11.11 Recall the example discussed in Section 3 of the sample of two numbers between 0 and 1000. The expected value of the estimate in any simple random selection of two numbers from this population is 500. However, depending on the luck of the draw, the estimate obtained from any one particular sample can be grossly different. As stated already, it could be as low as 0.5 to as high as 999.5.

11.12 With the current property audit estimates, given their large variances, it is highly improbable that one would achieve a similar point estimate using another random sample with the exact same sample design, during the same period of time, under the same conditions with the very same auditors. The variance is so poor, you cannot expect much stability in the estimates from different random selections using the very same sample design, much less a different (and better) one.

11.13 Dr. Bell goes so far as to state,

“There is no reason to expect that the results of any reasonable alternative would differ substantially in any particular direction.”⁵³

What he fails to address at this point is the precision of the estimates. Three pages later he does admit that the variance could have been reduced by an alternative

⁵³ *Affidavit of Robert M. Bell*, p. 2

design.⁵⁴ The point is, a better designed sample could produce more precise and hence, credible estimates.

11.14 Had a different sample design been used for the continuing property audits, a reasonable degree of precision could have been achieved for the estimates of overstated inventory value. However, the design that was used, was insufficient for that purpose. The outcome from the sample design deficiency is that the property audit estimates are too imprecise to be actionable.

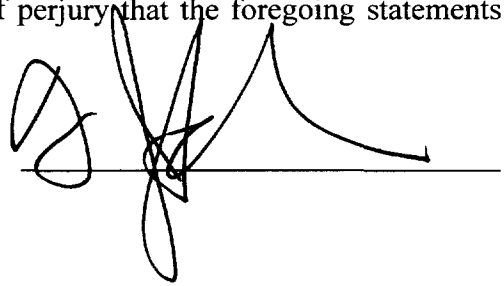
12 Conclusion.

12.1 Dr. Bell, Mr. Loebbecke and AT&T failed to address the basic deficiency of the continuing property record audits. That is, *the estimates for the value of the overstated inventory have extremely poor precision.* The audit sample was not designed to achieve reasonable precision levels for these estimates and the audit sample did not achieve reasonable precision for the estimates. The estimates margins of error for the value of overstated inventory are so large that the amounts reported by the FCC audit staff as overstated investment are unsound and cannot be fairly relied upon as the basis for reducing the RBOCs book values.

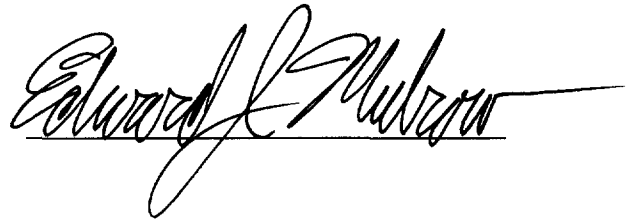
⁵⁴ Affidavit of Robert M. Bell, p. 5

DECLARATION

I, Fritz Scheuren, declare under penalty of perjury that the foregoing statements are true and correct.

A handwritten signature in black ink, appearing to be 'Fritz Scheuren', written over a horizontal line.

I, Edward J. Mulrow, declare under penalty of perjury that the foregoing statements are true and correct.

A handwritten signature in black ink, appearing to be 'Edward J. Mulrow', written over a horizontal line.

October 21, 1999

Dr. Fritz Scheuren

Urban Institute Senior Fellow

Fritz Scheuren, an Institute Senior Fellow, is an internationally recognized expert in survey statistics. He has held some of the highest positions in the U.S. government in statistics, including Director of the Statistics Division of the Internal Revenue Service and the Chief Mathematical Statistician for the Social Security Administration. Dr. Scheuren has consulted extensively with other government agencies, including work with the National Center for Education Statistics (NCES) on educational administrative data (Common Core Data) and on the School and Staffing Survey. His work for the Census Bureau in researching the use of administrative records in census-taking has received worldwide recognition. He was also the National Technical Director of Statistical Sampling at Ernst & Young LLP (from 1997 to 1999).

Dr. Scheuren's honors have been numerous. Among these he has been made a Fellow of the American Association for the Advancement of Science and a Fellow of the American Statistical Association. In 1995, he received the prestigious Shiskin Award for contributions to U.S. economic statistics; just last year (1998) he was honored by being given the Founders Award by the American Statistical Association – the highest award given for service to the statistical profession.

Dr. Scheuren's career has been characterized by technical and managerial leadership of major leading-edge research projects as evidenced by his many publications – well over a 150 in all -- of which only a small selection are listed below. Only illustrative references to research areas where Dr. Scheuren remains active have been cited.

Dr. Scheuren came to the Institute in January of 1999. Currently, he is in overall charge of the Urban Institute's National Survey of America's Families (NSAF). In addition to his managerial duties he is also the editor and a principal author in the 1997 NSAF Methodology Series (16 volumes to date). That survey is a major part of the Urban Institute's Assessing the New Federalism project. There have been two rounds of data collection so far – during 1997 (from which public use files are being released) and during 1999 (which is just now wrapping up and from which results will be available in 2000). Each round consists of a survey of over 40,000 households -- collecting information on the economic, health, and social dimensions of the well-being of children, adults under the age of 65, and their families.

In recent years Dr. Scheuren has acted as a regular consultant to the National Center for Education Statistics (NCES). Some of the work he did was on advanced forms of post-stratification weighting – in particular what have come to be called “calibration estimators.” He also worked on nonresponse issues and explored the feasibility of employing a Canadian Technique -- called “Mass Imputation” -- as a substitute for other forms of post-stratification, given that the frames available to NCES were so extensive.

Currently Vice-President of the American Statistical Association, Dr. Scheuren has formerly been a Member of the National Academy of Sciences, Committee on Applied and Theoretical Statistics; Scientific Secretary of the International Association of Survey Statisticians; Chair of the American Statistical Association's Section on Survey Research Methods; and President of the Washington Statistical Society.

There are many other ways Dr. Scheuren has supported the profession of statistics, for example as an associate editor for long periods at the *Journal of the American Statistical Association*, the *Journal of Business and Economic Statistics*, and *Survey Methodology*. He has and continues to be active as a referee for these journals and others.

Dr. Scheuren's involvement with human rights began with statistical research on Landmines (where he played a small part). Jody Williams was eventually to get the Nobel Peace Prize for this initiative. He has also worked on the search for statistically sound evidence concerning the gold taken from holocaust victims and placed in Swiss banks. This year at the statistical meetings in Baltimore he gave a presentation on his collaborative work on Guatemala Human Rights Research, entitled –

“Human Rights Violations in Guatemala,” (1999), *Proceedings, Section on Survey Research Methods, American Statistical Association*, (with P. Ball, H. Spirer, and W. Seltzer).

During the war with Yugoslavia this past spring, he was also asked to go to Albania and help mount what became the Kosovar Refugee Survey. The Kosovar efforts, reported on already in *Science* and in the *Amstat News*, continue. Eventually, it is hoped that the work will lead to a greater understanding of this tragedy.

National Technical Director of Statistical Sampling at Ernst & Young LLP (from 1997 to 1999). Much of the statistical work done was client-confidential and so can only be described in general terms. There have been, however, a fair number of audit sampling studies undertaken (involving IRS tax cases, plus some other regulatory agencies, notably the FCC). Inventory sampling was a mainstay too; however, the technical advances made in achieving more efficient inventory designs are proprietary and have not been published. Some of the work, notably for government agencies or given before Congress is public and can be cited. Examples are given below:

Interim Statistical Analysis for BellSouth Telecommunications (1998), Ernst & Young LLP, (with S. Hinkins, and E. Mulrow). This was an extensive report to the Louisiana Public Service Commission analyzing data required to be reported for regulatory purposes. Subsequent regulatory filings, not cited but which continue, are less extensive.

1997 National Bankruptcy Petition Study, Prepared for VISA and delivered to the House of Representatives in April 1998 (with Tom Neubig)

Surveying the Financial Service Needs of Non-Banked Households: Final Survey Design (1997), Ernst & Young LLP. This was prepared for the Office of the Controller of the Currency and led to two surveys.

Professor of Statistics at The George Washington University.

Dr. Scheuren taught statistics from 1994 to 1997, and he still teaches survey sampling. Since 1985, when Dr. Scheuren resumed teaching statistics on a regular basis, the cognitive problems of non-statistic majors became a focus of his research. This interest has gone so far that he teaches occasional courses at the USDA Graduate School on how people think and therefore learn statistics.

Director of Statistics at the Internal Revenue Service (1980 to 1994).

Most of the day-to-day responsibilities Dr. Scheuren had when in government were to help others prepare data for policy analyses, often using microsimulation models. While not an area in which he has done major research himself still he has contributed by running two major international conferences on individual and business tax microsimulation modeling – both in 1992. He has also worked on statistical matching – a commonly used and often criticized method for preparing the data to be introduced into policy microsimulation models.

Dr. Scheuren recently contributed a technical appendix to a 1999 report by John O'Hare for Health and Human Services on statistically matching the National Health Interview Survey and the Current Population Survey. He also has a doctoral student studying statistical matching.

Income and wealth research has been an area of continuing interest since before Dr. Scheuren's student days at the Office of Economic Opportunity. Some of his early work is reprinted in a ***1995 Compendium of IRS Estate Tax Wealth*** for which he also wrote the preface.

Chief organizer of two international conferences – in 1985 and 1997 -- on record linkage. These resulted in widely cited proceedings on which Dr. Scheuren played an editorial role: ***Record Linkage Techniques – 1985*** (published by the Internal Revenue Service) and ***Record Linkage Techniques – 1997*** (Published by Ernst & Young LLP).

Federal statistical agencies have numerous goals and Dr. Scheuren has written on these extensively from his vantagepoint as the head or former head of a major statistical organization. Some examples include

“Trust in The U.S. Statistical System,” (1995). ***Turning Administrative Systems into Information Systems***, Internal Revenue Service; Washington, DC.

“Turning Administrative Systems into Information Systems,” (1993), ***Journal of Official Statistics***, (with T. Petska).

“Statistical Research Problems in Government,” (1990), *Statistics of Income and Related Administrative Record Research: 1988-1989*, Internal Revenue Service.

“Goals for Statistical Uses of Administrative Records: The Next Ten Years,” (1985) *Journal of Business and Economic Statistics* (with T. Jabine).

The quality improvement revolution remains a theme in much of the research Dr. Scheuren has done. Examples of recent specific work in this area, which grew out of his years at the IRS, is summarized in the following:

“NSAF Quality Challenges and Responses in Surveying the Poor,” (1999). Welfare Conference, upcoming in November (with K. Wang and J. Kenney).

“IRS Test Call System,” (1997). *Survey Measurement and Process Quality*, Wiley: New York, (with Mary Batchner –1996).

“Total Quality Management in an Administration Setting,” (1996). *Data Quality* (with J. Mulrow).

Confidentiality and Privacy Research. – Research on Record Linkage techniques and analysis issues led naturally to concerns about reidentification risks in public use files and to confidentiality and privacy concerns in general. Some of the recent work done on this area includes

“Linking Data Sets: Information Needs Versus Privacy in the Computer Age — A Balancing Act?” (1999). Presented at the American Evaluation Association Conference (with Judy Droitcour).

“Preserving Both Confidentiality and the Ability to Calculate Variances in the National Health Interview Survey,” (1999), *Proceedings, Section on Survey Research Methods, American Statistical Association* (with S. Hinkins and V. Parsons).

“The Confidentiality Beasties: A Fable About the Elephant, the Duck, and the Pig,” (1998), *Turning Administrative Systems Into Information Systems*, Internal Revenue Service, (with J. Mulrow).

Chief Mathematical Statistician at the Social Security Administration (1972 to 1980).

Lead the team that conducted what is still the most comprehensive linkage of survey and administrative data to study U.S. income distribution issues. This Study has recently been updated to look at lifetime earnings and mortality differentials.

The second summary was developed as part of a major 1978 Williamsburg conference that Dr. Scheuren led in organizing. The goal of the conference was to showcase the survey research,

including record linkage, then being done in the Office of Research and Statistics at the Social Security Administration.

Beginning in the early 1980s the possibility that the U.S. might mount a partial decennial census using administrative records became an area of research. Some of the recent work published on this subject includes –

“Administrative Records and Census Taking,” (1999). *Survey Methodology*. Based on an earlier unpublished report submitted to the Census Bureau in May 1999.

Fritz Scheuren “The Census Sampling Controversy: When Can A Sample Be Better Than A Census?” (1997), *Consortium*.

“An Administrative Record Census in the U.S.?” (1995), *Chance*.

Handling nonresponse and other forms of missing data has been a major research focus, especially during the time Dr. Scheuren was a member of the National Academy of Science’s Panel on Incomplete Data in Surveys (1979 to 1983). He also conducted research on improving the (unconditional) efficiency of conventional sample designs along with work on ranking ratio estimation, which is a form of post-stratification and can lead to improved (conditional) efficiencies after data collection.

Dr. Scheuren received his doctorate in 1972; his dissertation topic was *Topics in Multivariate Finite Population Sampling and Data Analysis* (1972), The George Washington University.

Dr. Fritz Scheuren

Urban Institute Senior Fellow

Fritz Scheuren, an Institute Senior Fellow, is an internationally recognized expert in survey statistics. He has held some of the highest positions in the U.S. government in statistics, including Director of the Statistics Division of the Internal Revenue Service and the Chief Mathematical Statistician for the Social Security Administration. Dr. Scheuren has consulted extensively with other government agencies, including work with the National Center for Education Statistics (NCES) on educational administrative data (Common Core Data) and on the School and Staffing Survey. His work for the Census Bureau in researching the use of administrative records in census-taking has received worldwide recognition. He was also the National Technical Director of Statistical Sampling at Ernst & Young LLP (from 1997 to 1999).

Dr. Scheuren's honors have been numerous. Among these he has been made a Fellow of the American Association for the Advancement of Science and a Fellow of the American Statistical Association. In 1995, he received the prestigious Shiskin Award for contributions to U.S. economic statistics; just last year (1998) he was honored by being given the Founders Award by the American Statistical Association – the highest award given for service to the statistical profession.

Dr. Scheuren's career has been characterized by technical and managerial leadership of major leading-edge research projects as evidenced by his many publications – well over a 150 in all -- of which only a small selection are listed below. Only illustrative references to research areas where Dr. Scheuren remains active have been cited.

Dr. Scheuren came to the Institute in January of 1999. Currently, he is in overall charge of the Urban Institute's National Survey of America's Families (NSAF). In addition to his managerial duties he is also the editor and a principal author in the 1997 NSAF Methodology Series (16 volumes to date). That survey is a major part of the Urban Institute's Assessing the New Federalism project. There have been two rounds of data collection so far – during 1997 (from which public use files are being released) and during 1999 (which is just now wrapping up and from which results will be available in 2000). Each round consists of a survey of over 40,000 households -- collecting information on the economic, health, and social dimensions of the well-being of children, adults under the age of 65, and their families.

In recent years Dr. Scheuren has acted as a regular consultant to the National Center for Education Statistics (NCES). Some of the work he did was on advanced forms of post-stratification weighting – in particular what have come to be called “calibration estimators.” He also worked on nonresponse issues and explored the feasibility of employing a Canadian Technique -- called “Mass Imputation” -- as a substitute for other forms of post-stratification, given that the frames available to NCES were so extensive.

Currently Vice-President of the American Statistical Association, Dr. Scheuren has formerly been a Member of the National Academy of Sciences, Committee on Applied and Theoretical Statistics; Scientific Secretary of the International Association of Survey Statisticians; Chair of the American Statistical Association's Section on Survey Research Methods; and President of the Washington Statistical Society.

There are many other ways Dr. Scheuren has supported the profession of statistics, for example as an associate editor for long periods at the *Journal of the American Statistical Association*, the *Journal of Business and Economic Statistics*, and *Survey Methodology*. He has and continues to be active as a referee for these journals and others.

Dr. Scheuren's involvement with human rights began with statistical research on Landmines (where he played a small part). Jody Williams was eventually to get the Nobel Peace Prize for this initiative. He has also worked on the search for statistically sound evidence concerning the gold taken from holocaust victims and placed in Swiss banks. This year at the statistical meetings in Baltimore he gave a presentation on his collaborative work on Guatemala Human Rights Research, entitled –

“Human Rights Violations in Guatemala,” (1999), *Proceedings, Section on Survey Research Methods, American Statistical Association*, (with P. Ball, H. Spirer, and W. Seltzer).

During the war with Yugoslavia this past spring, he was also asked to go to Albania and help mount what became the Kosovar Refugee Survey. The Kosovar efforts, reported on already in *Science* and in the *Amstat News*, continue. Eventually, it is hoped that the work will lead to a greater understanding of this tragedy.

National Technical Director of Statistical Sampling at Ernst & Young LLP (from 1997 to 1999). Much of the statistical work done was client-confidential and so can only be described in general terms. There have been, however, a fair number of audit sampling studies undertaken (involving IRS tax cases, plus some other regulatory agencies, notably the FCC). Inventory sampling was a mainstay too; however, the technical advances made in achieving more efficient inventory designs are proprietary and have not been published. Some of the work, notably for government agencies or given before Congress is public and can be cited. Examples are given below:

Interim Statistical Analysis for BellSouth Telecommunications (1998), Ernst & Young LLP, (with S. Hinkins, and E. Mulrow). This was an extensive report to the Louisiana Public Service Commission analyzing data required to be reported for regulatory purposes. Subsequent regulatory filings, not cited but which continue, are less extensive.

1997 National Bankruptcy Petition Study, Prepared for VISA and delivered to the House of Representatives in April 1998 (with Tom Neubig)

Surveying the Financial Service Needs of Non-Banked Households: Final Survey Design (1997), Ernst & Young LLP. This was prepared for the Office of the Controller of the Currency and led to two surveys.

Professor of Statistics at The George Washington University.

Dr. Scheuren taught statistics from 1994 to 1997, and he still teaches survey sampling. Since 1985, when Dr. Scheuren resumed teaching statistics on a regular basis, the cognitive problems of non-statistic majors became a focus of his research. This interest has gone so far that he teaches occasional courses at the USDA Graduate School on how people think and therefore learn statistics.

Director of Statistics at the Internal Revenue Service (1980 to 1994).

Most of the day-to-day responsibilities Dr. Scheuren had when in government were to help others prepare data for policy analyses, often using microsimulation models. While not an area in which he has done major research himself still he has contributed by running two major international conferences on individual and business tax microsimulation modeling – both in 1992. He has also worked on statistical matching – a commonly used and often criticized method for preparing the data to be introduced into policy microsimulation models.

Dr. Scheuren recently contributed a technical appendix to a 1999 report by John O'Hare for Health and Human Services on statistically matching the National Health Interview Survey and the Current Population Survey. He also has a doctoral student studying statistical matching.

Income and wealth research has been an area of continuing interest since before Dr. Scheuren's student days at the Office of Economic Opportunity. Some of his early work is reprinted in a ***1995 Compendium of IRS Estate Tax Wealth*** for which he also wrote the preface.

Chief organizer of two international conferences – in 1985 and 1997 -- on record linkage. These resulted in widely cited proceedings on which Dr. Scheuren played an editorial role: ***Record Linkage Techniques – 1985*** (published by the Internal Revenue Service) and ***Record Linkage Techniques – 1997*** (Published by Ernst & Young LLP).

Federal statistical agencies have numerous goals and Dr. Scheuren has written on these extensively from his vantagepoint as the head or former head of a major statistical organization. Some examples include

“Trust in The U.S. Statistical System,” (1995). ***Turning Administrative Systems into Information Systems***, Internal Revenue Service; Washington, DC.

“Turning Administrative Systems into Information Systems,” (1993), ***Journal of Official Statistics***, (with T. Petska).

“Statistical Research Problems in Government,” (1990), *Statistics of Income and Related Administrative Record Research: 1988-1989*, Internal Revenue Service.

“Goals for Statistical Uses of Administrative Records: The Next Ten Years,” (1985) *Journal of Business and Economic Statistics* (with T. Jabine).

The quality improvement revolution remains a theme in much of the research Dr. Scheuren has done. Examples of recent specific work in this area, which grew out of his years at the IRS, is summarized in the following:

“NSAF Quality Challenges and Responses in Surveying the Poor,” (1999). Welfare Conference, upcoming in November (with K. Wang and J. Kenney).

“IRS Test Call System,” (1997). *Survey Measurement and Process Quality*, Wiley: New York, (with Mary Batcher –1996).

“Total Quality Management in an Administration Setting,” (1996). *Data Quality* (with J. Mulrow).

Confidentiality and Privacy Research. – Research on Record Linkage techniques and analysis issues led naturally to concerns about reidentification risks in public use files and to confidentiality and privacy concerns in general. Some of the recent work done on this area includes

“Linking Data Sets: Information Needs Versus Privacy in the Computer Age — A Balancing Act?” (1999). Presented at the American Evaluation Associate Conference (with Judy Droitcour).

“Preserving Both Confidentiality and the Ability to Calculate Variances in the National Health Interview Survey,” (1999), *Proceedings, Section on Survey Research Methods, American Statistical Association* (with S. Hinkins and V. Parsons).

“The Confidentiality Beasties: A Fable About the Elephant, the Duck, and the Pig,” (1998), *Turning Administrative Systems Into Information Systems*, Internal Revenue Service, (with J. Mulrow).

Chief Mathematical Statistician at the Social Security Administration (1972 to 1980).

Lead the team that conducted what is still the most comprehensive linkage of survey and administrative data to study U.S. income distribution issues. This Study has recently been updated to look at lifetime earnings and mortality differentials.

The second summary was developed as part of a major 1978 Williamsburg conference that Dr. Scheuren led in organizing. The goal of the conference was to showcase the survey research,

including record linkage, then being done in the Office of Research and Statistics at the Social Security Administration.

Beginning in the early 1980s the possibility that the U.S. might mount a partial decennial census using administrative records became an area of research. Some of the recent work published on this subject includes –

“Administrative Records and Census Taking,” (1999). *Survey Methodology*. Based on an earlier unpublished report submitted to the Census Bureau in May 1999.

Fritz Scheuren “The Census Sampling Controversy: When Can A Sample Be Better Than A Census?” (1997), *Consortium*.

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9/22/99

September 22, 1999

EX PARTE

EX PARTE OR LATE FILED

Ms. Magalie R. Salas
Secretary
Federal Communications Commission
Room TW-A325, The Portals
445 Twelfth Street
Washington, D.C. 20554

RE: CC Docket No. 99-117, Notice of Inquiry, Accounting Practices of Certain Telephone Companies

Dear Ms. Salas:

This letter summarizes several essential points regarding the Federal Communications Commission (FCC) audits of the continuing property records (CPRs) of the Regional Bell Operating Companies (RBOCs). It is our view that these issues severely undermine the credibility of the FCC's audit process, findings and recommendations. We recommend that these issues be seriously considered as a part of the Notice of Inquiry established by this Commission.

1. Generally accepted auditing standards (GAAS) and other authoritative standards require the auditor to consider *all appropriate evidence* in reaching a conclusion regarding the fair presentation of an account balance. The FCC staff performed no additional procedures to validate the findings from its physical verification testing.
 - The FCC audit reports demonstrate that the FCC staff did not consider all the material documentation submitted by the companies as evidence of the existence of hardwire central office equipment (COE) items the FCC considered "not found." The evidence submitted by the companies suggests that the FCC staff should have taken additional steps to verify the information and update the audit findings, if appropriate. Further, there appeared to be little or no communication of audit findings with company management throughout the audit process - such communication is necessary to, at a minimum, validate audit results.
 - The FCC's audit procedures were severely biased in that the tests performed could only detect instances of potential overstatement in the plant accounting records. Any tests to determine the possibility of the existence of assets that are not reflected on the accounting records were not performed.

2. The conclusions reached by the FCC were inappropriate given the statistical sampling methods used by the FCC staff. The FCC staff set out to perform an audit of carrier compliance with the FCC's CPR Rules for hardwire COE, and attempted to perform a test of compliance with such Rules. In its audit report, however, the FCC staff attempted to extrapolate these test results to form a conclusion as to the fair statement of the dollar value of COE account balances. With respect to the FCC's audit procedures and conclusions:
 - It is not possible nor is it appropriate to reach any conclusion regarding a dollar value using the sampling methodology chosen by the FCC staff. The FCC staff designed and performed a test of compliance with the CPR Rules, not one designed to assess the accuracy of COE plant account balances. In addition, it is not possible for the FCC to retroactively "correct" the shortcomings of its CPR audit sample.
 - The standards used by the FCC staff to evaluate test results were unclear. In many instances, audit results were modified after the auditors left the field.
3. Notwithstanding the problems with the FCC's audit identified above, the FCC misapplied statistical theory in reaching its conclusions regarding the recommended "write-off" amounts. The FCC's estimated amount of the so-called "missing" hardwire COE (recommended write-off amount) is significantly overstated for several reasons:
 - The audit procedures were incomplete and results biased towards potential overstatements as discussed above.
 - The FCC's proposed adjustment reflects a point within their estimate of error based on their sample testing. In a statistical sample, one can only estimate errors within a range of confidence. As no single value within such a range is any more likely to be correct than any other, auditing standards state that no adjustment above the lower value in the confidence interval can be justified and, then, only if all other aspects of the sampling methodology are correct.
4. The FCC's extrapolated amounts suggested for write-off ignore the effects of accumulated depreciation. In other words, the FCC overstatement amounts represent gross, not net, book value.
5. Even if the audit results were reflective of the proper CPR balances, under price cap regulation, the audit results would have no impact on telephone rates, as such rates no longer relate to the value of investment in the CPRs. Even under traditional rate of return regulation, the cumulative impact of these results would be minimal due to the use of mass asset accounting and remaining life depreciation.

Ms. Magalie R. Salas
September 22, 1999
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6. Separate and apart from the fundamental problems with the FCC's CPR audit, the FCC's Property Record Requirements themselves are an unnecessary requirement of the regulatory past and surpass the level of detail required to maintain a proper system of internal control for COE. The FCC should simplify its Rules and Regulations as they pertain to property records and expense limits so that the costs of compliance and internal controls do not exceed the benefits derived therefrom.

As stated in the first paragraph of this letter, we believe that these issues should be seriously considered as a part of the Notice of Inquiry established by this Commission. Should you have any further questions or comments, please feel free to call Carl at (303) 291-9249, T.J. at (404) 870-1081, or John at (303) 628-4302.


Sincerely,



Carl R. Geppert
ARTHUR ANDERSEN LLP



T. J. Mangold
PRICEWATERHOUSECOOPERS LLP



John W. Putnam
ERNST & YOUNG LLP